Summary of Proposed Amendments to the Bay-Delta Water Quality Control Plan

July 6, 2018

Introduction

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta) is a critical part of California's water supply system and an ecosystem in crisis. The Bay-Delta includes the Sacramento–San Joaquin Delta (Delta), Suisun Marsh, and San Francisco Bay. California's two largest rivers, the Sacramento and the San Joaquin, converge in the Delta and meet incoming seawater from the Pacific Ocean in San Francisco Bay. The Bay-Delta is a critically important natural resource for California and the nation. It is both the hub of California's water supply system and the most valuable estuary and wetlands system on the west coast, serving cities, farms, fishing communities, boaters, and fish and wildlife.

The Bay-Delta was once a vast tidal marsh teeming with fish and wildlife, including several iconic species, such as Chinook salmon. Reclamation of farmland in the Delta and diversion of water through and from the Bay-Delta led to vibrant farming and urban development throughout California, which co-existed with native fish and wildlife for decades. In more recent years, increasing water diversions and land reclamation for urban and agricultural development have played significant roles in the precipitous decline of fish and wildlife species. Many of these species are now threatened or endangered. Some species are still able to marginally support important commercial fisheries. However, with the continued decline of these species, the future of these commercial fisheries is jeopardized.

Since passage of the Porter-Cologne Water Quality Control Act in 1969, and subsequent passage of the federal Clean Water Act and federal and State endangered species acts, state and federal agencies have taken steps to improve conditions for fish and wildlife while protecting water for cities and agriculture. Yet on balance, Californians continue to take more water out of the Bay-Delta and its tributaries than the species can withstand.

Many State and federal agencies are working on multiple fronts to protect, restore, and enhance the Bay-Delta, while considering water supplies for cities and agriculture. Evidence gathered over more than 10 years by researchers, the State Water Board, and state and federal fisheries agencies shows a crucial need to update the requirements for the benefit of both people and fish. The State Water Board has a unique role in Bay-Delta efforts. The Board establishes water quality objectives to protect human and fish and wildlife uses in the Bay-Delta Plan, and the Board uses its water rights and water quality authority to implement those water quality objectives.

The Bay-Delta Plan and the Proposed Amendments

The San Francisco Bay/Sacramento-San Joaquin Delta Estuary Water Quality Control Plan (Bay-Delta Plan) establishes water quality objectives to protect uses of water in the Bay-Delta watershed, including drinking water supply, irrigation supply, and fish and wildlife habitat.

On July 6, 2018, State Water Board staff released a proposed final substitute environmental document (proposed Final SED) in support of amendments to the Bay-Delta Plan to adopt new and revised flow water quality objectives for the Lower San Joaquin River and its three salmon-bearing tributaries, the Stanislaus, Tuolumne, and Merced Rivers, revised salinity water quality objectives in the southern Delta, and a program of implementation. The new flow objectives recognize the vital role upstream flows provide for habitat and migration of threatened and endangered fish. The revised salinity objectives reflect updated scientific information about salt levels that are suitable for agriculture in the southern Delta.

While the proposal focuses on the Lower San Joaquin River and its tributaries and the southern Delta, the State Water Board is also in the midst of developing a proposal for updating flow requirements for the Sacramento River, its tributaries, and the Delta and its tributaries, including the Calaveras, Cosumnes, and Mokelumne Rivers, Delta outflow objectives, Delta interior flow objectives, and coldwater habitat objectives. In furtherance of this effort, the State Water Board has released a Framework document that previews a forthcoming draft staff report and allows the public to better understand how the two updates relate to one another and how each watershed is being asked to share responsibility for protecting fish and wildlife for the betterment of the entire Bay-Delta system.

The State Water Board is engaging in two watershed-based planning strategies in order to more fully take into account the distinct hydrologic, species, environmental, and water use characteristics of each region. For more information visit https://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/.

Why is the State Water Board Updating the Bay-Delta Plan Now?

More than ten years ago, the State Water Board identified San Joaquin River flows and southern Delta salinity as priority issues that required additional evaluation and planning. Failure to address these issues now could result in draconian actions under the state or federal Endangered Species Act or federal action to establish water quality standards for the Bay-Delta. On the other hand, addressing these issues now provides a platform for responding to future droughts, adapting to climate change, and improving water resource management.

The changes would amend the Bay-Delta Plan, which establishes water quality requirements for the Bay-Delta and lays out water quality objectives that protect various water uses, including drinking water, irrigation, fish and wildlife, and more. In establishing the water quality requirements, the State Water Board must consider all beneficial uses of water in determining how to reasonably protect particular uses. Rather than “choose” one use over another, the Board must “maximize” support of all the Bay-Delta’s uses.

For more than a decade, continuing decline of the Bay-Delta ecosystem has reinforced the need for action. Several native fish species have been listed as protected under the State or federal Endangered Species Act. Water diversion from the San Joaquin River system has surpassed the watershed’s ability to support healthy fish populations. As described more fully below, the Bay-Delta Plan amendments are 1) addressing factors that contribute to the decline of key fish species, 2) incorporating new science in State

Water Board planning processes, and 3) providing a framework for voluntary agreements that enhance fish and wildlife.

As part of the 2009 Delta Reform Act, the California Legislature directed the State Water Board to develop flow criteria to protect Bay-Delta public trust uses. Keeping with the prescribed direction of the legislation, the Board's 2010 report *Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem* (Delta Flow Criteria Report) presents a technical assessment of flow and operational requirements to protect fish under existing conditions without balancing fish needs with other uses of water. The report determined that 60 percent of the unimpaired flow of the San Joaquin River from February through June and 75 percent of the unimpaired flow on the Sacramento River and its tributaries was necessary to preserve the attributes of a natural, variable system to which native fish species are adapted. The report also pointed to the need for more natural and variable flows on the Stanislaus, Tuolumne, and Merced Rivers to provide adequate conditions for salmon spawning, rearing, and migration throughout the fish species of concern's lifecycle.

The Delta Flow Criteria Report reviews the scientific basis for modifying the amount and timing of flows on the three tributaries, but the report was not designed to look at, nor did it look at, the effect that increasing unimpaired flow would have on other competing uses of water or the environment, which is something that the State Water Board must do in setting flow objectives. This analysis is presented in the proposed Final SED. The proposed Final SED includes information on which the State Water Board can consider recommendations for new flow and salinity objectives along with their costs, impacts, and benefits.

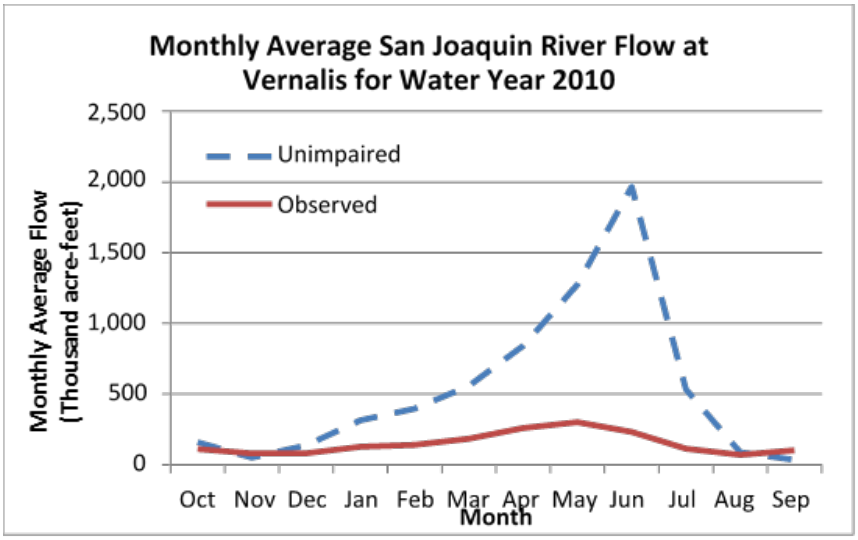
New Flow Objectives

The current Bay-Delta Plan defines a specific flow objective at a single point on the Lower San Joaquin River below the confluence of the tributaries (at Vernalis), but there are no existing flow objectives for the Stanislaus, Tuolumne, or Merced Rivers, and these tributaries are not now required to contribute to San Joaquin River flow at Vernalis. The new flow objectives require a portion of flow be maintained in all three tributaries during certain times of year to ensure suitable habitat and migratory pathways for native fish. Both the Delta Flow Criteria Report and the State Water Board's peer-reviewed February 2012 *Technical Report on the Scientific Basis for Alternative San Joaquin River Flow and Southern Delta Salinity Objectives* (Scientific Basis Report) explain the need for increased flows of a more variable and natural pattern in the tributaries and Lower San Joaquin River to help provide the conditions to which species have evolved over the centuries.

The State Water Board is amending the Bay-Delta Plan to reasonably protect fish and wildlife and address the balance of instream needs and human uses. The new flow objectives will enhance water flows upstream of the Delta to support the migratory and spawning habitat of native fish. As recommended in the Delta Flow Criteria Report and Scientific Basis Report, the new flow objectives require a portion of unimpaired flow be maintained in each of the tributaries from February through June.

Unimpaired flow is the quantity and rate of water that would collect in a river from rain and snowmelt and move downstream if there were no reservoirs or diversions to change the

amount and timing of the flow. Unimpaired flow generally mimics the natural flows on which fish and wildlife have evolved and depend. As illustrated in the figure below, observed flows in the San Joaquin River are far lower than unimpaired flows even in years of above-normal unimpaired flow, like 2010, due to diversion of water to reservoirs and deliveries for immediate uses such as municipal or irrigation water supply.



Like the San Joaquin River, flows in the tributaries are also far lower than unimpaired flows due to diversion of water. The new flow objectives do not call for flows equal to natural, pre-development conditions. Instead, each tributary will be required to maintain 40 percent of unimpaired flow, within a range of 30 to 50 percent, from February through June.

From 1984 to 2009, median February through June flows in the Merced, Tuolumne, and Stanislaus Rivers were 26, 21, and 40 percent of unimpaired flow, respectively. This means that half of the time, flows in the tributaries were less, and in some cases far less, than 40 percent of unimpaired flow because of the extent of diversions to storage or for contemporary use. State Water Board analysis shows that 40 percent of unimpaired flow, within a range of 30 to 50 percent, will reasonably protect fish and wildlife while moderating impacts to water supply for human uses.

Adaptive Implementation

The program of implementation for the new flow objectives also includes an adaptive implementation framework. Under the adaptive implementation framework, the new flow objectives do not require rigid real-time adherence to a specific percent of unimpaired flow. Instead, the flow can be managed as a block of water or "water budget" to provide more functionally useful flows if scientific information indicates that this approach would better protect fish and wildlife beneficial uses. In this way, starting at 40 percent unimpaired flow within an adaptive range of 30 to 50 percent unimpaired flow can better supports the needs of fish and wildlife while moderating impacts on surface water supply for other beneficial uses.

For example, if the best available scientific evidence indicates that 35 percent of unimpaired flow in February and 45 percent of unimpaired flow in May would better meet the narrative water quality objective to protect fish and wildlife and any biological goals

adopted under the plan by providing additional habitat and optimal temperatures for migrating fish, a shift of some of the water from February to May by lowering the unimpaired flow requirement in February to 35 percent and increasing the unimpaired flow requirement in May to 45 percent could be approved. This is just one example of how the amount and timing of flows could be adaptively managed to maximize benefits to fish and wildlife.

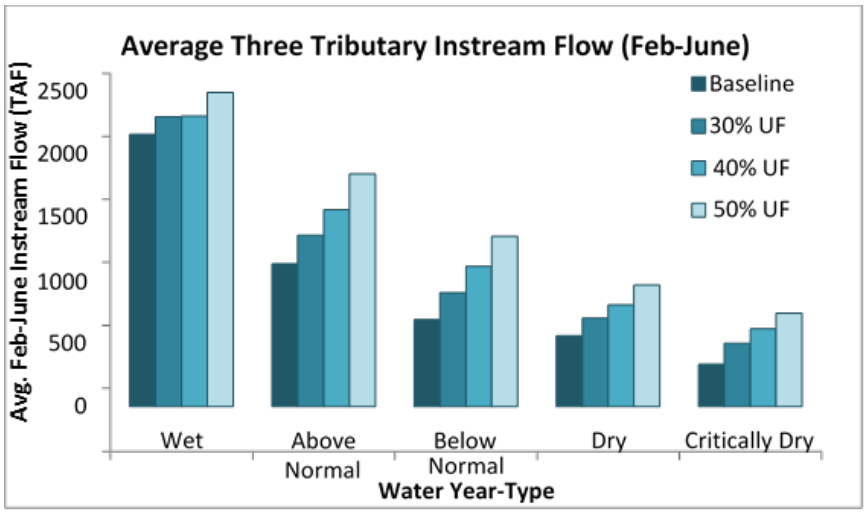
Approval can occur in two ways. The program of implementation requires the formation of a Stanislaus, Tuolumne, and Merced Working Group (STM Working Group) to assist with implementation, and monitoring and evaluation of effectiveness of the flow requirements. The program of implementation encourages state and federal fisheries agencies, water users, and others to participate in the STM Working Group with State Water Board staff. One or more members of the STM Working Group could recommend the February to May shift to the Executive Director, and the Executive Director could approve it on an annual basis if it met plan requirements. Independently, the State Water Board also has the authority to meet and approve adaptive implementation changes on an annual or long-term basis if such changes meet the requirements set out in the plan.

Non-flow measures, like floodplain restoration, gravel enhancement, fish-passage improvements, and suppression of predatory fish, also play a role in adaptive implementation. The Bay-Delta Plan recognizes that non-flow measures serve an important role in river restoration by supporting native fish and wildlife and promoting ecosystem improvements that complement flow for the reasonable protection of fish and wildlife. Under adaptive implementation, the implementation of non-flow measures that increase the biological benefits of the flow objectives could allow for a reduction in the required percent of unimpaired flow, as long as the percent of unimpaired flow remains within the 30 to 50 percent range. The Executive Director can approve a change to the percent of unimpaired flow on an annual basis with the consensus of the STM Working Group, or the State Water Board could meet and approve such a change.

Biological goals that assess improvements to fish populations resulting from flow and other actions will be an important tool to inform future Board decisions on potential adjustment to the unimpaired flow objective. Basically, adaptive implementation will 1) allow for the optimization of flows to reasonably protect fish and wildlife uses while allowing for consideration of other beneficial uses, such has water for human uses, provided that these other considerations do not reduce the intended benefits to fish and wildlife; 2) allow for nimble responses to changing information and conditions; and 3) minimize unintended impacts and potential water supply effects.

Benefits of the Flow Proposal

In most instances the new flow objectives will provide more unimpaired flow (also called instream flow) than existing baseline conditions. This will more closely align San Joaquin River watershed flows with the flow conditions to which native species are adapted. With a 40 percent of unimpaired flow requirement, average annual February through June instream flow for the tributaries would increase by 288 thousand acre-feet (TAF). The effects would be larger at 50 percent of unimpaired flow (485 TAF) and smaller at 30 percent of unimpaired flow (174 TAF); the biggest benefits would occur in dry years.



Flow influences nearly every feature of habitat that impacts fish and other wildlife, including water temperature, water chemistry, and the availability of physical habitat. These features, in turn, affect the risk of disease and predation, reproductive success, growth, migration, and feeding behavior of native fish. Adding flow objectives for the tributaries will help ensure that benefits for native fish extend further into the watershed and along migratory routes.

State Water Board analysis shows that, when implemented, the new flow objectives will significantly improve the quantity and quality of habitat for fish and wildlife. With 30, 40 and 50 percent of unimpaired flow in February through June, temperature targets that are protective of all life stages of native fish are reached more frequently than under baseline conditions. The largest benefits will occur in dry years, particularly in the Tuolumne and Merced Rivers. Salmon rearing temperature thresholds for the month of May will be met twice as frequently in critically dry years with 40 percent of unimpaired flow as they are currently.

There are many other benefits of a more natural flow regime during the spring months, including a reduction in nonnative fish and nonnative vegetation. Large flow pulses in the spring are expected to help protect migrating juvenile fish from predators, and higher instream flows will increase floodplain inundation. Floodplain inundation is important because it provides abundant food and a safer environment for growing fish. Average annual floodplain inundation would increase by 35 percent with 40 percent of unimpaired flow.

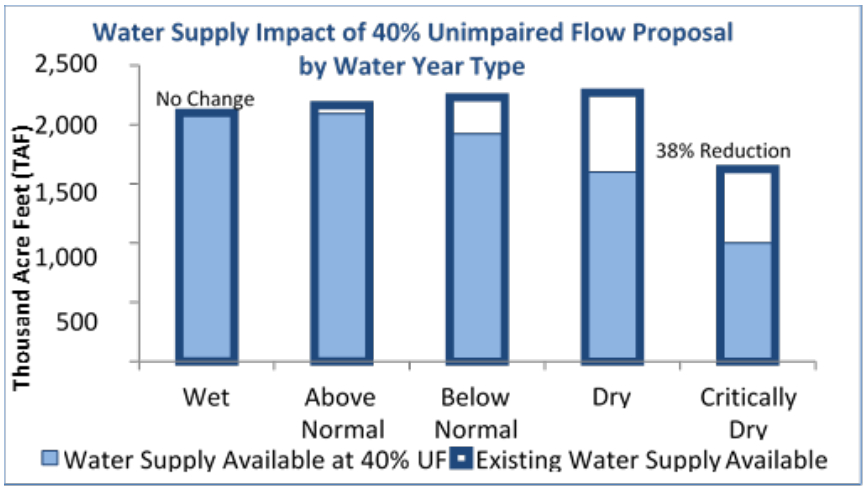
Potential Water Supply Impacts of the Flow Proposal

The new flow objectives require more water to remain instream to reasonably protect fish and wildlife to establish a better balance between human uses and the needs of fish and wildlife. This could reduce the surface water available for human uses, especially during drier years, and make water conservation and other tools like groundwater banking even more important than they already are. The reduced water supply would primarily affect agriculture, but would also affect drinking water supplies and hydropower generation.

State Water Board staff examined the impacts of a range of unimpaired flow objectives, 20 to 60 percent, on surface water supply because restoring instream flows would, on

average, reduce the amount of water available for human uses. The evaluation found that 40 percent of unimpaired flow fulfills the most Bay-Delta Plan goals while moderating adverse effects on surface water for human uses.

Implementing the 40 percent of unimpaired flow objective, within a range of 30 to 50 percent, is expected to reduce the water available for human use between 7 and 23 percent, on average.
The figure below shows the effect of the 40 percent unimpaired flow requirement on water supply during different water year types. During wet years, there will be almost no impact because there is abundant flow to share, but significant impacts on diversions could occur in the driest years.



The potential impacts on the agricultural economy increase as the unimpaired flow percentage increases. A 40 percent of unimpaired flow requirement is projected to result in an average annual decrease in economic output of $69 million. This represents a 2.5 percent reduction from baseline annual average agricultural economic sector output of $2.6 billion. The impact would be lower at 30 percent ($35 million) and higher at 50 percent ($123 million). However, these impacts do not consider the mitigation actions water users would likely use to lessen economic effects, such as water efficiency, conservation, changes in crop type, or groundwater recharge projects.

Flow Proposal and Groundwater

As surface water availability declines, local water users have historically turned to groundwater. This could cause or exacerbate groundwater overdraft, at least in the short-term, until projects and programs are implemented under the Sustainable Groundwater Management Act. In the San Joaquin River Watershed, surface water and groundwater have been over extracted for a long time. This overreliance has degraded native fish populations, increased river temperatures, and caused depleted groundwater basins. State Water Board analysis shows that when the new flow objective is implemented, groundwater substitution by local water users could result in a further increase in groundwater pumping.

In the future, as local agencies implement Sustainable Groundwater Management Act measures, there may be less groundwater available for agricultural irrigation. The difference between what is available and what is needed will depend on actions local

agencies and water users take, such as improved irrigation efficiency and enhanced groundwater recharge, to reduce water supply impacts. While the new objectives do not require these types of actions, the proposed Final SED identifies actions that stakeholders can take to address and lessen effects on groundwater supplies in the environmental documentation in support of the Bay-Delta update. The State Water Board recognizes that adjusting to reductions in water supplies will be challenging for water users as these actions progress. Sustainably managing surface water and groundwater resources together is the only way to ensure the protection of both resources.

Opportunities to Reduce Water Supply Impacts

The State Water Board recognizes that factors other than flow can degrade conditions for native fish. Factors impacting fish throughout the watershed include, non-native species, predation, high water temperatures, barriers to fish passage, and habitat loss. As a result, the Bay-Delta Plan amendments recommend non-flow measures to complement the new flow objectives. Implementing non-flow measures can potentially reduce the flows needed, within the 30 to 50 percent range.

The State Water Board also recognizes that voluntary agreements can accelerate implementation of the new water quality objectives. If done correctly, voluntary agreements can reasonably protect fish and wildlife and provide long-lasting solutions in the Bay-Delta Watershed. The Board encourages stakeholders to work together to reach voluntary agreements that incorporate a mix of flow and non-flow measures that meet or exceed the new objectives and protect fish and wildlife.

The State Water Board will consider voluntary agreements as part of Board proceedings to implement the Bay-Delta Plan. In evaluating any agreement, the Board will consider whether the agreement will help achieve the water quality objectives, protect the beneficial use, and be enforceable through Board action. The Board will also make any independent findings required by law to implement the Bay-Delta Plan. Depending upon the strength of the voluntary agreement and success in meeting specified goals, the State Water Board could reduce the unimpaired flow requirement as low as 30 percent; however, the Board is interested in receiving potential plan amendment language which would authorize implementation, upon affirmative concurrence from the California Department of Fish and Wildlife, of a coordinated control of flows and other, non-flow factors that would achieve benefits comparable to the unimpaired flow requirements.

Southern Delta Salinity Objectives

Salinity is a measure of how much salt is dissolved in water and is often expressed in units of deciSiemens per meter (dS/M). The current southern Delta salinity objectives are set at two different levels. In April through August, the objective is 0.7 dS/m. In September through March, the objective is 1.0 dS/m. These objectives apply at four fixed-point compliance locations in the southern Delta. The State Water Board is proposing a year-round salinity objective of 1.0 dS/m and compliance would be determined at one-fixed point compliance location and three channel segment compliance locations.

High concentrations of salt in irrigation water can reduce crop yields. However, analyses of southern Delta water quality and crop salinity requirements show that the existing April through August salinity objective is more stringent than what is needed to reasonably

protect agricultural crops. Revising the southern Delta salinity objectives will better reflect current conditions and updated scientific knowledge.

While the proposal will update southern Delta salinity objectives, the Bureau of Reclamation will be required to comply with the current salinity requirements at Vernalis (as a conditions of its water rights) to implement and meet the proposed salinity water quality objective in the interior southern Delta.

The new flow objectives complement the salinity objectives by increasing flow in the southern Delta. Increased flows from February through June have the incidental benefit of flushing salts early in the irrigation season, and providing lower salinity conditions during spring germination of crops, which is generally the most salt sensitive time.

Implementation of the Flow Objectives

The State Water Board's evaluation and adoption of the plan amendments, by themselves, do not impose requirements on any water users to comply with the plan amendments that are enforceable by the State Water Board, but the program of implementation commits the State Water Board to fully implement the LSJR flow objectives by 2022. Unless water users enter into voluntary agreements to implement an updated Bay-Delta Plan, the State Water Board will take actions to require implementation of the LSJR flow objectives through water right or water quality actions, such as conditioning of water rights, adoption of regulations, and other water quality actions. These actions will include imposing enforceable requirements based on the flows needed to achieve the objectives.

Next Steps

The State Water Board will begin consideration of whether to approve the proposed Final SED and the San Joaquin River and southern Delta salinity amendments to the Bay-Delta Plan at a public meeting commencing on August 21, 2018 meeting. The proposal and additional information regarding the adoption process can be accessed here.